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Attorneys for Plaintiffs

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN FRANCISCO DIVISION

ANGEL FRALEY; PAUL WANG; SUSAN MAINZER; JAMES H. DUVAL, a minor, by and through JAMES DUVAL, as Guardian ad Litem; and W. T., a minor, by and through RUSSELL TAIT, as Guardian ad Litem; individually and on behalf of all others similarly situated,

Plaintiffs,

v.

FACEBOOK, INC., a corporation; and DOES 1-100,

Defendants.

Case No. CV 11-01726 RS

DECLARATION OF PHILLIP ALLMAN, PH.D. REGARDING THE VALUE OF INJUNCTIVE RELIEF

1. I, Phillip Allman, Ph.D., declare and state as follows:

2. I have been retained as an expert by Plaintiffs' attorney to consult with them concerning the factual issues presented in the above case.

3. I am a professional economist and the founder of Allman & Petersen Economics, LLC, established in 1984. I received my Ph.D. in economics from Michigan State University in 1982. Prior to starting Allman Economic Analysis, I was a professor of economics at the University of the Pacific (UOP). I specialize in monetary theory, which forms the bases of the theory of finance. While teaching at UOP, I taught money and banking, senior seminar in monetary theory, and managerial economics. Decision theory, option theory, and capital budgeting were important topics covered in these courses. Between 1995 and 1998 I taught courses in the master's program at Golden Gate University in San Francisco. At Golden Gate University I taught the master's course in Macroeconomics and the master's course in financial institutions and markets. An integral part of the financial markets course was the analysis of financial instruments, which included options and futures markets analysis. My areas of expertise are financial and labor economics. I have published articles on topics such as forecasting interest rates and wage growth, and valuing pensions for divorce proceedings.

4. A significant part of my practice involves calculating the value of options and valuing the net present value of capital investments, which are particularly relevant to this case as discussed below. Examples of cases in which I have been retained to determine option values are *Masters v. Boston Scientific*, *Dimery v. Super Shuttle* (Genentech option evaluations), *Lynch v. Amgen*, and *Fanelli v. BMC Software*. I have testified in over 500 trials. I have experience in complex commercial litigation cases nationally.

5. I have reviewed the following documents that are pertinent to the calculation of damages in this case, including:

   a. The tentative settlement agreement between plaintiffs and Facebook, including the provisions regarding injunctive relief and the steps Facebook will take to inform its users about the nature of Sponsored Stories and the features it will

create to allow users to control if and how they are featured in Sponsored Stories.

b. The Declaration of Fernando Torres in Support of Plaintiffs' Motion for Class Certification laying out his valuation of actual damages.

c. The Declaration of Fernando Torres regarding the Value of Injunctive Relief. This Declaration supports the argument that user endorsements in online social networks are a valuable asset in a growing market. This declaration further demonstrates Mr. Torres' method for valuing the injunctive relief in this case.

d. The Court's Order of August 17, 2012 denying without prejudice the parties' motion for preliminary approval of the settlement.

6. Furthermore, in the course of my work in this case, I have reviewed and relied upon the following authoritative references:

a. Pindyck, Robert, "Introduction to the Theory and Application of Real Options";

b. Guthrie, Graeme, "Real Options in Theory and Practice";

c. Alleman, James and Eli Noam (eds.), "The New Investment Theory of Real Options and its Implications for Telecommunications Economics";

d. Cotropia, Christopher, "Describing Patents as Real Options," Journal of Corporation Law (Vol. Thirty-four: Four).

These are the types of materials experts in my field typically rely on when completing similar assignments.

7. Having reviewed the tentative settlement agreement, particularly those provisions relating to injunctive relief, and discussed the terms therein with counsel for Plaintiffs, I have been asked to provide a valuation of this injunctive relief.

8. The injunctive relief includes provisions requiring clarification of the "Facebook Terms" informing users that Facebook will be permitted to place users' names and likenesses in Sponsored Stories ads, a new control allowing users to see when they have appeared in Sponsored Stories ads and remove themselves from such ads, a new requirement that minor

users (under 18 years of age) indicate they have parent/guardian consent for their use in Sponsored Stories ads, and new features in the "Family Safety Center" on the Facebook website explaining Sponsored Stories ads.

9. I believe this aspect of the settlement provides the class with a real and direct economic benefit. I have valued injunctive relief as a consultant and as an expert in connection with numerous legal actions and can confirm that it is not a simple task to place a precise value on injunctive relief. There are, however, methods that can be used to calculate a reasonably accurate value for injunctive relief in this case.

10. Fernando Torres calculated the value of the injunctive relief in this case by measuring the incremental monthly value user endorsements add to standard advertisements. His method then treated these endorsements as valuable assets that Facebook was using without the users' knowledge or consent. By informing users of their appearance in Sponsored Stories ads and giving them the ability to remove themselves from such ads, Mr. Torres found the injunctive relief effectively gives the users control over this valuable asset. It follows, therefore, that the value of the injunctive relief is this case is could be equal to the value of the asset the users will now control, which Mr. Torres calculated to have a market value equal to the price advertisers were willing to pay for the users' endorsements. On this basis, Mr. Torres calculated the value of the injunctive relief at approximately $9,400,000.00 per month, or approximately $226,000,000 in total.

11. From an economic standpoint, the method used by Mr. Torres is a potentially suitable method for calculating the value of injunctive relief. The method appropriately calculates the additional revenue generated by the users' endorsements, finds that the users did not have control over these endorsements prior to the implementation of the injunctive relief, and finds the users will have control of these endorsements as a consequence of the injunctive relief.

12. An alternative approach is to view the injunctive relief as providing plaintiffs with a "real option" and to determine the value of that real option using well-established option

valuation methodologies, as described below.

Real Option Valuation of the Injunctive Relief

13. A real option is the right, but not the obligation, to undertake a certain initiative. Real option valuation is a method of calculating the value of that right. Real options have an economic value for the beneficiaries of these options because they provide alternatives that would not otherwise be available and may provide benefits that will prove valuable at a point in the future.

14. Real option valuation is often used in capital budgeting for evaluating potential future business decisions, such as delaying, abandoning, expanding, or contracting capital investments. Real option valuation is also applied to a wide range of activities including valuing patents, which allow one to take or not take a certain action in the future. For example, a product patent gives its holder the option to develop and market a product in the future. Real option valuation allows the patent holder to analyze the value of that option today in spite of the fact that product may not yet exist and there is presently no market for the product. Real option valuation is ideal for valuing intellectual property because such property often has no market, or is "illiquid" at the time of the valuation, but may have a market in the future.

15. A real option is inherently challenging to value because all of the above inputs can be difficult to obtain and require estimations. Nonetheless, the concept of real option valuation is accepted in the financial industry and, when performed using a statistically appropriate range of alternatives, provides a reasonable assessment of an option's value. In situations where an asset is known to have some economic value, but that asset's precise value is inherently challenging to ascertain because there is no market for the asset, real option valuation often provides the best measure of the asset's value.

16. Real option valuation is an ideal method for valuing the injunctive relief in this case. The real option that the plaintiffs are being provided by the injunctive relief in this case is the option to remain in Sponsored Stories ads in which they appear or to exclude themselves from Sponsored Stories ads in which they appear. The asset underlying this option, the plaintiff

class members' endorsements, presently has no market. Users who opt to exclude themselves from Sponsored Stories ads cannot presently market their endorsement to other potential buyers. Additionally, there have not been financial transactions between the plaintiff class and Facebook for the use of plaintiffs' endorsements. Nonetheless, the underlying asset is economically valuable as demonstrated by the fact that user-endorsed advertisements generate higher revenue than standard ads.[1] Therefore, the option to exercise the use of the underlying asset is economically valuable. The value of this asset is also based on the likelihood that there will be a market for this type of endorsement in the future. I have reviewed the Declaration of Mr. Torres Regarding the Value of the Injunctive Relief and various articles indicating that there is a burgeoning market for personal information, including information collected for the purpose of online product endorsements. These sources prove that users of online social networks are increasingly engaged in the growing market for their endorsements in exchange for a share of ad revenue. The examples of Chime.in; Allow Ltd.; and Personal, Inc. cited in Mr. Torres's further demonstrate that companies currently exist to facilitate the creation of this market by giving users of social media a platform to link with advertisers.

17. Like a patent-holder, the plaintiff class in this case is gaining control over the use of their endorsements, and the option to exercise that control in the future as a result of the injunctive relief afforded in the settlement agreement. Also like the patent market, there is not currently a widely known market where the class members can transact for the use of their endorsements, but evidence indicates there will likely be such a market in the future. Because the product is expected have value in the future, the option to control associated with those two alternatives has value. For these reasons, real option valuation is a proper method of valuing the injunctive relief.

18. The inputs necessary to perform real option valuation are referred to as the "spot price" of the asset underlying the option, the "exercise price" of the option, the risk free interest rate, the period of time until the right to exercise the option expires, and the "volatility" of the

[1] This is demonstrated in the Declaration of Fernando Torres in Support of Class Certification.

underlying asset's value.

a. Spot price is defined as an estimate of the present value of the asset. The spot price of the asset is based on the net present value of the estimated future cash flow generated by the asset over a predetermined period of time.

b. The exercise price is the cost to initiate the cash flow of the underlying asset.

c. Volatility, or "σ" is a measure of the uncertainty regarding the present value of the asset. The volatility of an asset is based on variability in the price of the asset. The variability in price is estimated based on the historical variability of the asset, the historical variability of similar assets, the probability of various market scenarios (i.e. the size of the market for the asset, anticipated demand for the asset, etc.), and the variability of the value that other market players in the same industry assign its assets.

In this case, the option is called a "binary option" because the holders of the option have two alternatives – either allow their endorsements to be used in Sponsored Stories ads or opt to exclude themselves from allowing their endorsements to appear in Sponsored Stories ads. One or the other must be true. This type of option can be valued employing the "Black-Scholes Model" of options valuation.[2] This model uses the inputs mentioned above (spot price, exercise price, risk free interest rate, time period in which the option can be exercised, and volatility) to calculate a range of values. In this case, the class members are sellers or "writers" of the call options.

19. The option value in this case can be calculated using a spot price of $1.55.[3] This spot price is based on the estimated number of users in the plaintiff class who can be featured as endorsers in Sponsored Stories ad campaigns (123,868,976 users) and the approximate net

[2] The Black-Scholes model was introduced by Fischer Black and Myron Scholes in 1973 in the Journal of Political Economy. The model uses a mathematical equation to model a financial market. From the model, one can deduce the price of "European-style options," or options that have a pre-determined exercise date. Following the introduction of the model into the field of finance, markets around the world adopted it as a scientifically legitimate means of calculating option values for options trading. Empirical tests show the Black–Scholes model is an accurate way to calculate the price of the option over time. Scholes eventually received the Nobel Prize in Economics for the model's inception.

[3] See Table 2, attached herewith.

present value of the of the projected future flow of incremental profits over the next 24 months (determined by plaintiffs' experts to be $9,400,000.00 per month in aggregate). An appropriate volatility in this instance is .54 based on the volatility in Facebook's stock call option.[4] This volatility is appropriate in this instance because it measures market expectations for volatility in Facebook products, including the Sponsored Stories ads from which the relevant endorsement values have been measured.

20. Calculating the value of the injunctive relief using this method results in a range of possible values, which is the standard and reasonable method of measuring an option such as this. The call option value ranges from $.4639 per user (or $57,462,817.97 in aggregate to the class), assuming the buyer of the options will pay to the class members (the sellers of options) the full present discounted value of currently projected profits generated by the endorsements in order to induce the class members to continue their endorsements; to $.8572 per user (or $106,180,486.23 in aggregate to the class), assuming the buyer of the options will pay to the class members (the sellers of options) 50% of the present discounted value of currently projected profits generated by the endorsements in order to induce the class members to continue their endorsements; to $1.1721 per user (or $145,186,826.77 in aggregate to the class), assuming the buyer of the options will pay to the class members (the sellers of options) 25% of the present discounted value of currently projected profits generated by the endorsements in order to induce the class members to continue their endorsements.[5] The percentage of the value of the endorsement captured by class members represents the exercise price of the option, as this is the cost required of the buyer of the option (Facebook or some other buyer) to initiate the cash flow of the underlying asset.

[4] See Table 3, attached herewith.
[5] See Table 1, attached herewith.

21. I declare under the penalty of perjury and under the laws of the United States of America that the forgoing is true and correct and based upon my personal knowledge and/or professional opinions, and that if called upon to testify, I could verify the accuracy of the same. This document was executed in the city of Oakland, California on October 3, 2012.

By:_____
PHILLIP ALLMAN, PH.D.

Table 1

REAL OPTION VALUE OF FACEBOOK SPONSORED STORIES ARISING FROM USE OF CLASS MEMBERS NAMES (VALUE OF A CALL OPTION USING BLACK SCHOLES MODEL)

Present Date	Grant Date	Expected Option Period	Days to End of Expected Option Period	Years to End of Expected Option Period	Exercise Cost	Spot Price (09/24/12)	Implied Volatility	Risk Free Interest Rate	**Black Scholes' Call Price**
09/24/12	09/24/12	09/24/14	730	2.00	$0.7750 1A	$1.55 2	0.54 3	0.27% 4	$0.8572 5
09/24/12	09/24/12	09/24/14	730	2.00	$1.5500 1B	$1.55 2	0.54 3	0.27% 4	$0.4639 5
09/24/12	09/24/12	09/24/14	730	2.00	$0.3875 1C	$1.55 2	0.54 3	0.27% 4	$1.1721 5

1A. Present Discounted Value of Future Facebook Returns to Sponsored Stories per class member (see Table 2): $1.55 x 50% (assumes half of currently projected profits shown on Table 2 are paid to class members to continue with their endorsements).

1B. Present Discounted Value of Future Facebook Returns to Sponsored Stories per class member (see Table 2): $1.55 (assumes ALL of currently projected profits shown on Table 2 are paid to class members to continue with their endorsements).

1C. Present Discounted Value of Future Facebook Returns to Sponsored Stories per class member (see Table 2): $1.55 x 25% (assumes one-fourth of currently projected profits shown on Table 2 are paid to class members to continue with their endorsements).

2. Present Discounted Value of Future Facebook Returns to Sponsored Stories per class member (see Table 2): $1.55 is the per class member value of the underlying asset held by each class member which creates the means to generate incremental profits to Facebook.

3. Estimated from Facebook Stock Options on 09/24/12: see Table 3.

4. Based on the term structure of yields on Federal Securities.

5. The Black-Scholes Call Option Pricing Model formula for European options is specified in Robert Kolb, "Futures, Options, and Swaps", Blackwell Business Publications.

Table 2

PRESENT DISCOUNTED VALUE OF FUTURE INCREMENTAL INCOME FROM USE OF THE CLASS SPONSORED STORIES ADS PROJECTED TO GENERATE FOR FACEBOOK

Period		Years to End of Period	Monthly Incremental Income	Present Discounted Value
09/24/12 -	10/24/12	0.09	$9,400,000 [1]	$9,273,825 [2]
10/24/12 -	11/23/12	0.17	$9,400,000	$9,154,920
11/24/12 -	12/24/12	0.25	$9,400,000	$9,033,654
12/24/12 -	01/23/13	0.34	$9,400,000	$8,917,829
01/24/13 -	02/23/13	0.42	$9,400,000	$8,799,703
02/24/13	03/26/13	0.51	$9,400,000	$8,683,141
03/24/13	04/23/13	0.58	$9,400,000	$8,579,188
04/24/13	05/24/13	0.67	$9,400,000	$8,465,547
05/24/13	06/23/13	0.75	$9,400,000	$8,357,006
06/24/13	07/24/13	0.83	$9,400,000	$8,246,309
07/24/13	08/23/13	0.92	$9,400,000	$8,140,579
08/24/13	09/23/13	1.00	$9,400,000	$8,032,748
09/24/13	10/24/13	1.09	$9,400,000	$7,926,346
10/24/13	11/23/13	1.17	$9,400,000	$7,824,718
11/24/13	12/24/13	1.25	$9,400,000	$7,721,072
12/24/13	01/23/14	1.34	$9,400,000	$7,622,076
01/24/14	02/23/14	1.42	$9,400,000	$7,521,113
02/24/14	03/26/14	1.51	$9,400,000	$7,421,488
03/24/14	04/23/14	1.58	$9,400,000	$7,332,639
04/24/14	05/24/14	1.67	$9,400,000	$7,235,511
05/24/14	06/23/14	1.75	$9,400,000	$7,142,740
06/24/14	07/24/14	1.83	$9,400,000	$7,048,127
07/24/14	08/23/14	1.92	$9,400,000	$6,957,760
08/24/14	09/23/14	2.00	$9,400,000	$6,865,597
				$192,303,636
Value per Class Member (assumes 123,868,976 class members)				**$1.5525**

1. June 13, 2012 Declaration of Mr. Torres, p. 3.
2. 17% estimated cost of capital to Facebook based on capital asset pricing model.

Table 3

IMPLIED VOLATILITY ESTIMATES
(Facebook, Inc. FB)

Present Date	Expiration Date	Days to Expiration	Excercise Price	Stock Price (09/24/12)	Call Price	Risk Free Interest Rate	**Implied Volatility**
09/24/12	03/15/13	172	$20.00	$21.07	$3.60	0.140%	0.541 [1]
09/24/12	01/17/14	480	$20.00	$20.98	$5.50	0.208%	0.539
							0.540

1. The Black-Scholes Call Option Pricing Model formula for European options is specified in Robert Kolb, "Futures, Options, and Swaps", Blackwell Business Publications. Associated software performs implied volatility analysis.